Space Weather Forecast

Issued on Saturday, 03 September 2022 at 13:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of R1/R2 Radio Blackouts. G1/G2 Minor/Moderate Geomagnetic Storm expected day 1 or 2 (3rd/4th Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low but with frequent common class flares. Of the four active regions on the visible disc, AR3089 remains the largest and most complex region. This region continues to grow in areal extent and complexity, now with a delta configuration. The other 3 sunspots in the east are all relatively simple.

A marked filament eruption was observed leaving the sun on 02 Sept. The CME that followed is modelled to have been passing mostly behind and below the Earth, though there is a chance of a glancing blow on 05 Sept (day 3). No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: The coronal mass ejection that left the sun on 02 Sept may give Earth a glance on 05 Sept. No other Earth-directed coronal mass ejections expected otherwise. Solar winds are expected to remain generally elevated from now until 06 Sept (day 4), under successive coronal hole high speed streams. Wind speeds are then expected to fall back to slightly elevated or background from early on 06 Sept (day 4) onward. Geomagnetic activity is therefore expected to be Unsettled to Active from the outset with further G1/G2 Minor/Moderate storm intervals between 03 Sept and 05 Sept (days 1-3), due to coronal hole and CME influences. Geomagnetic activity is then expected to slowly return to Quiet or Unsettled from 06 Sept (day 4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is at background levels, with no solar radiation storms occurring

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain largely Low, with an ongoing chance of Moderate flares at times, mostly from AR3089. However, a new region may rotate onto the northeast limb on day 3 (05th), potentially increasing the probabilities of a significant flare.

Solar Wind / Geomagnetic Activity: The CME that left the sun on 02nd Sept may give Earth a glance on 05th. No other Earth-directed CMEs expected otherwise. Solar winds are expected to remain slightly elevated on day 1, under small coronal hole influences. They should then become elevated or perhaps strong on day 2, due to the connection with the larger CH20/+. Geomagnetic activity is therefore expected to be Quiet to Unsettled on day 1, but Unsettled to Active with a few G1/G2 Minor/Moderate storm intervals on days 2 and 3 (04th & 05th), due to coronal hole and CME influences. Geomagnetic activity then slowly returning to Quiet and Unsettled levels on day 4 (06th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain below the Minor Radiation Storm level (S1). There remains a slight chance of further increases to or above the S1 level, should any significant flares occur from the large region on the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	80	50	5
Strong	G3	No	5	10	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	35	35
Very Active	R3 to R5 X	No	3	3	3	3

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	3	3	3	3
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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